eurofins | Lancaster Laboratories Environmental

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# Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

November 06, 2014

Project: MHIC Annual Sampling

Submittal Date: 10/27/2014
Group Number: 1514157
PO Number: MHIC ANNUAL SAMPLING
State of Sample Origin: PA

| Client Sample Description | Lancaster Labs (LL) # |
|---|---|
| MW-455_20141024 Grab Groundwater | 7653047 |
| MW-456_20141024 Grab Groundwater | 7653048 |
| Trip Blank Water | 7653049 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO Stantec Attn: Stephanie Andrews

Respectfully Submitted,

Amek Carter
Specialist

(717) 556-7252

**Sample Description: MW-455_20141024 Grab Groundwater**
**MHIC Annual Sampling**

**LL Sample # WW 7653047**
**LL Group # 1514157**
**Account # 11183**

**Project Name: MHIC Annual Sampling**

Collected: 10/24/2014 12:50 by CD

Submitted: 10/27/2014 17:20
Reported: 11/06/2014 12:32

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

MH455

| CAT No. | Analysis Name | CAS Number | As Received Result | | As Received Method Detection Limit | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260B** | | **ug/l** | | **ug/l** | |
| 10335 | Benzene | 71-43-2 | 210 | | 0.5 | 1 |
| 10335 | sec-Butylbenzene | 135-98-8 | 5 | | 1 | 1 |
| 10335 | tert-Butylbenzene | 98-06-6 | 4 | J | 1 | 1 |
| 10335 | Cyclohexane | 110-82-7 | 310 | | 10 | 5 |
| 10335 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.5 | 1 |
| 10335 | Ethylbenzene | 100-41-4 | 140 | | 0.5 | 1 |
| 10335 | n-Hexane | 110-54-3 | 200 | | 10 | 5 |
| 10335 | Isopropylbenzene | 98-82-8 | 32 | | 1 | 1 |
| 10335 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | | 0.5 | 1 |
| 10335 | Naphthalene | 91-20-3 | 94 | | 1 | 1 |
| 10335 | Toluene | 108-88-3 | 230 | | 0.5 | 1 |
| 10335 | 1,2,4-Trimethylbenzene | 95-63-6 | 270 | | 1 | 1 |
| 10335 | 1,3,5-Trimethylbenzene | 108-67-8 | 110 | | 1 | 1 |
| 10335 | Xylene (Total) | 1330-20-7 | 570 | | 0.5 | 1 |
| **GC/MS Semivolatiles** | **SW-846 8270C** | | **ug/l** | | **ug/l** | |
| 01476 | Acenaphthene | 83-32-9 | N.D. | | 0.1 | 1 |
| 01476 | Anthracene | 120-12-7 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(a)anthracene | 56-55-3 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(a)pyrene | 50-32-8 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(b)fluoranthene | 205-99-2 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(g,h,i)perylene | 191-24-2 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(k)fluoranthene | 207-08-9 | N.D. | | 0.1 | 1 |
| 01476 | 1,1'-Biphenyl | 92-52-4 | 2 | | 0.5 | 1 |
| 01476 | Di-n-butylphthalate | 84-74-2 | N.D. | | 2 | 1 |
| 01476 | Chrysene | 218-01-9 | N.D. | | 0.1 | 1 |
| 01476 | Dibenz(a,h)anthracene | 53-70-3 | N.D. | | 0.1 | 1 |
| 01476 | Diethylphthalate | 84-66-2 | N.D. | | 2 | 1 |
| 01476 | 2,4-Dimethylphenol | 105-67-9 | N.D. | | 0.5 | 1 |
| 01476 | 2,4-Dinitrophenol | 51-28-5 | N.D. | | 10 | 1 |
| 01476 | bis(2-Ethylhexyl)phthalate | 117-81-7 | N.D. | | 2 | 1 |
| 01476 | Fluoranthene | 206-44-0 | N.D. | | 0.1 | 1 |
| 01476 | Fluorene | 86-73-7 | 0.1 | J | 0.1 | 1 |
| 01476 | Indeno(1,2,3-cd)pyrene | 193-39-5 | N.D. | | 0.1 | 1 |
| 01476 | 2-Methylnaphthalene | 91-57-6 | 57 | | 0.1 | 1 |
| 01476 | 2-Methylphenol | 95-48-7 | 0.9 | J | 0.5 | 1 |
| 01476 | 4-Methylphenol | 106-44-5 | 3 | | 0.5 | 1 |
| | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. | | | | | |
| 01476 | Naphthalene | 91-20-3 | 89 | | 0.1 | 1 |
| 01476 | 4-Nitrophenol | 100-02-7 | N.D. | | 10 | 1 |
| 01476 | Phenanthrene | 85-01-8 | 0.1 | J | 0.1 | 1 |
| 01476 | Phenol | 108-95-2 | 1 | J | 0.5 | 1 |
| 01476 | Pyrene | 129-00-0 | N.D. | | 0.1 | 1 |
| 01476 | Pyridine | 110-86-1 | N.D. | | 2 | 1 |
| 01476 | Quinoline | 91-22-5 | N.D. | | 1 | 1 |

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis.

**Sample Description: MW-455_20141024 Grab Groundwater**
**MHIC Annual Sampling**

**LL Sample # WW 7653047**
**LL Group # 1514157**
**Account # 11183**

**Project Name: MHIC Annual Sampling**

Collected: 10/24/2014 12:50 by CD

Submitted: 10/27/2014 17:20
Reported: 11/06/2014 12:32

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

MH455

| CAT No. | Analysis Name | CAS Number | As Received Result | | As Received Method Detection Limit | Dilution Factor |
|---|---|---|---|---|---|---|
| | The recovery for the sample surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. | | | | | |
| **GC Miscellaneous** | **SW-846 8011** | | **ug/l** | | **ug/l** | |
| 10398 | Ethylene dibromide | 106-93-4 | N.D. | | 0.0095 | 1 |
| **Metals Dissolved** | **SW-846 6010B** | | **ug/l** | | **ug/l** | |
| 07052 | Cobalt | 7440-48-4 | N.D. | | 1.0 | 1 |
| 07061 | Nickel | 7440-02-0 | N.D. | | 1.6 | 1 |
| 07071 | Vanadium | 7440-62-2 | N.D. | | 1.9 | 1 |
| 07072 | Zinc | 7440-66-6 | 5.1 | J | 2.0 | 1 |
| | **SW-846 6020** | | **ug/l** | | **ug/l** | |
| 06035 | Lead | 7439-92-1 | 6.7 | | 0.082 | 1 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/15.
This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 10335 | 8260 VOCs | SW-846 8260B | 1 | N143022AA | 10/30/2014 05:40 | Amanda K Richards | 5 |
| 10335 | 8260 VOCs | SW-846 8260B | 1 | N143032AA | 10/31/2014 00:18 | Amanda K Richards | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030B | 1 | N143022AA | 10/30/2014 05:40 | Amanda K Richards | 5 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030B | 2 | N143032AA | 10/31/2014 00:18 | Amanda K Richards | 1 |
| 01476 | Skinner List in Water by 8270C | SW-846 8270C | 1 | 14302WAE026 | 11/04/2014 19:19 | Holly Berry | 1 |
| 10467 | BNA Water Extraction Skinner | SW-846 3510C | 1 | 14302WAE026 | 10/29/2014 18:45 | Nicholas W Shroyer | 1 |
| 10398 | EDB in Wastewater | SW-846 8011 | 1 | 143040001A | 11/03/2014 15:04 | Jessica L Miller | 1 |
| 07786 | EDB Extraction | SW-846 8011 | 1 | 143040001A | 10/31/2014 11:30 | Edwin Ortiz | 1 |
| 07052 | Cobalt | SW-846 6010B | 1 | 143021848003 | 10/31/2014 08:33 | Eric L Eby | 1 |
| 07061 | Nickel | SW-846 6010B | 1 | 143021848003 | 10/31/2014 08:33 | Eric L Eby | 1 |
| 07071 | Vanadium | SW-846 6010B | 1 | 143021848003 | 10/31/2014 08:33 | Eric L Eby | 1 |
| 07072 | Zinc | SW-846 6010B | 1 | 143021848003 | 10/31/2014 08:33 | Eric L Eby | 1 |
| 06035 | Lead | SW-846 6020 | 1 | 143026050004A | 10/31/2014 11:43 | Choon Y Tian | 1 |
| 01848 | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1 | 143021848003 | 10/30/2014 10:19 | Micaela L Dishong | 1 |
| 06050 | ICP/MS SW-846 Water Digest | SW-846 3020A | 1 | 143026050004 | 10/30/2014 09:35 | Micaela L Dishong | 1 |

**Sample Description: MW-456_20141024 Grab Groundwater**
**MHIC Annual Sampling**

**LL Sample # WW 7653048**
**LL Group # 1514157**
**Account # 11183**

**Project Name: MHIC Annual Sampling**

Collected: 10/24/2014 13:15 by CD

Submitted: 10/27/2014 17:20
Reported: 11/06/2014 12:32

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

MH456

| CAT No. | Analysis Name | CAS Number | As Received Result | | As Received Method Detection Limit | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260B** | | **ug/l** | | **ug/l** | |
| 10335 | Benzene | 71-43-2 | 640 | | 3 | 5 |
| 10335 | sec-Butylbenzene | 135-98-8 | 4 | J | 1 | 1 |
| 10335 | tert-Butylbenzene | 98-06-6 | 3 | J | 1 | 1 |
| 10335 | Cyclohexane | 110-82-7 | 320 | | 10 | 5 |
| 10335 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.5 | 1 |
| 10335 | Ethylbenzene | 100-41-4 | 200 | | 0.5 | 1 |
| 10335 | n-Hexane | 110-54-3 | 210 | | 10 | 5 |
| 10335 | Isopropylbenzene | 98-82-8 | 30 | | 1 | 1 |
| 10335 | Methyl Tertiary Butyl Ether | 1634-04-4 | 0.5 | J | 0.5 | 1 |
| 10335 | Naphthalene | 91-20-3 | 74 | | 1 | 1 |
| 10335 | Toluene | 108-88-3 | 310 | | 3 | 5 |
| 10335 | 1,2,4-Trimethylbenzene | 95-63-6 | 190 | | 1 | 1 |
| 10335 | 1,3,5-Trimethylbenzene | 108-67-8 | 88 | | 1 | 1 |
| 10335 | Xylene (Total) | 1330-20-7 | 740 | | 0.5 | 1 |
| **GC/MS Semivolatiles** | **SW-846 8270C** | | **ug/l** | | **ug/l** | |
| 01476 | Acenaphthene | 83-32-9 | 0.3 | J | 0.1 | 1 |
| 01476 | Anthracene | 120-12-7 | 0.1 | J | 0.1 | 1 |
| 01476 | Benzo(a)anthracene | 56-55-3 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(a)pyrene | 50-32-8 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(b)fluoranthene | 205-99-2 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(g,h,i)perylene | 191-24-2 | N.D. | | 0.1 | 1 |
| 01476 | Benzo(k)fluoranthene | 207-08-9 | N.D. | | 0.1 | 1 |
| 01476 | 1,1'-Biphenyl | 92-52-4 | 1 | | 0.5 | 1 |
| 01476 | Di-n-butylphthalate | 84-74-2 | N.D. | | 2 | 1 |
| 01476 | Chrysene | 218-01-9 | N.D. | | 0.1 | 1 |
| 01476 | Dibenz(a,h)anthracene | 53-70-3 | N.D. | | 0.1 | 1 |
| 01476 | Diethylphthalate | 84-66-2 | N.D. | | 2 | 1 |
| 01476 | 2,4-Dimethylphenol | 105-67-9 | N.D. | | 0.5 | 1 |
| 01476 | 2,4-Dinitrophenol | 51-28-5 | N.D. | | 10 | 1 |
| 01476 | bis(2-Ethylhexyl)phthalate | 117-81-7 | N.D. | | 2 | 1 |
| 01476 | Fluoranthene | 206-44-0 | N.D. | | 0.1 | 1 |
| 01476 | Fluorene | 86-73-7 | 0.6 | | 0.1 | 1 |
| 01476 | Indeno(1,2,3-cd)pyrene | 193-39-5 | N.D. | | 0.1 | 1 |
| 01476 | 2-Methylnaphthalene | 91-57-6 | 5 | | 0.1 | 1 |
| 01476 | 2-Methylphenol | 95-48-7 | 0.8 | J | 0.5 | 1 |
| 01476 | 4-Methylphenol | 106-44-5 | N.D. | | 0.5 | 1 |
| | 3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds. | | | | | |
| 01476 | Naphthalene | 91-20-3 | 35 | | 0.1 | 1 |
| 01476 | 4-Nitrophenol | 100-02-7 | N.D. | | 10 | 1 |
| 01476 | Phenanthrene | 85-01-8 | 0.7 | | 0.1 | 1 |
| 01476 | Phenol | 108-95-2 | 1 | J | 0.5 | 1 |
| 01476 | Pyrene | 129-00-0 | N.D. | | 0.1 | 1 |
| 01476 | Pyridine | 110-86-1 | N.D. | | 2 | 1 |
| 01476 | Quinoline | 91-22-5 | N.D. | | 1 | 1 |

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis.

**Sample Description: MW-456_20141024 Grab Groundwater**
**MHIC Annual Sampling**

**LL Sample # WW 7653048**
**LL Group # 1514157**
**Account # 11183**

**Project Name: MHIC Annual Sampling**

Collected: 10/24/2014 13:15 by CD

Submitted: 10/27/2014 17:20
Reported: 11/06/2014 12:32

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

MH456

| CAT No. | Analysis Name | CAS Number | As Received Result | | As Received Method Detection Limit | Dilution Factor |
|---|---|---|---|---|---|---|
| | The recovery for the sample surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. | | | | | |
| **GC Miscellaneous** | **SW-846 8011** | | **ug/l** | | **ug/l** | |
| 10398 | Ethylene dibromide | 106-93-4 | N.D. | | 0.0096 | 1 |
| **Metals Dissolved** | **SW-846 6010B** | | **ug/l** | | **ug/l** | |
| 07052 | Cobalt | 7440-48-4 | 5.5 | | 1.0 | 1 |
| 07061 | Nickel | 7440-02-0 | N.D. | | 1.6 | 1 |
| 07071 | Vanadium | 7440-62-2 | N.D. | | 1.9 | 1 |
| 07072 | Zinc | 7440-66-6 | 5.6 | J | 2.0 | 1 |
| | **SW-846 6020** | | **ug/l** | | **ug/l** | |
| 06035 | Lead | 7439-92-1 | 5.1 | | 0.082 | 1 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/15.
This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 10335 | 8260 VOCs | SW-846 8260B | 1 | N143022AA | 10/30/2014 06:28 | Amanda K Richards | 5 |
| 10335 | 8260 VOCs | SW-846 8260B | 1 | N143032AA | 10/31/2014 00:42 | Amanda K Richards | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030B | 1 | N143022AA | 10/30/2014 06:28 | Amanda K Richards | 5 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030B | 2 | N143032AA | 10/31/2014 00:42 | Amanda K Richards | 1 |
| 01476 | Skinner List in Water by 8270C | SW-846 8270C | 1 | 14302WAE026 | 11/04/2014 19:49 | Holly Berry | 1 |
| 10467 | BNA Water Extraction Skinner | SW-846 3510C | 1 | 14302WAE026 | 10/29/2014 18:45 | Nicholas W Shroyer | 1 |
| 10398 | EDB in Wastewater | SW-846 8011 | 1 | 143040001A | 11/03/2014 15:19 | Jessica L Miller | 1 |
| 07786 | EDB Extraction | SW-846 8011 | 1 | 143040001A | 10/31/2014 11:30 | Edwin Ortiz | 1 |
| 07052 | Cobalt | SW-846 6010B | 1 | 143021848003 | 10/31/2014 10:04 | Eric L Eby | 1 |
| 07061 | Nickel | SW-846 6010B | 1 | 143021848003 | 10/31/2014 10:04 | Eric L Eby | 1 |
| 07071 | Vanadium | SW-846 6010B | 1 | 143021848003 | 10/31/2014 10:04 | Eric L Eby | 1 |
| 07072 | Zinc | SW-846 6010B | 1 | 143021848003 | 10/31/2014 10:04 | Eric L Eby | 1 |
| 06035 | Lead | SW-846 6020 | 1 | 143026050004A | 10/31/2014 11:44 | Choon Y Tian | 1 |
| 01848 | WW SW846 ICP Digest (tot rec) | SW-846 3005A | 1 | 143021848003 | 10/30/2014 10:19 | Micaela L Dishong | 1 |
| 06050 | ICP/MS SW-846 Water Digest | SW-846 3020A | 1 | 143026050004 | 10/30/2014 09:35 | Micaela L Dishong | 1 |

**Sample Description: Trip Blank Water**
**MHIC Annual Sampling**

**LL Sample # WW 7653049**
**LL Group # 1514157**
**Account # 11183**

**Project Name: MHIC Annual Sampling**

Collected: 10/24/2014

Submitted: 10/27/2014 17:20
Reported: 11/06/2014 12:32

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

MHICT

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit | Dilution Factor |
|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260B** | | **ug/l** | **ug/l** | |
| 10335 | Benzene | 71-43-2 | N.D. | 0.5 | 1 |
| 10335 | sec-Butylbenzene | 135-98-8 | N.D. | 1 | 1 |
| 10335 | tert-Butylbenzene | 98-06-6 | N.D. | 1 | 1 |
| 10335 | Cyclohexane | 110-82-7 | N.D. | 2 | 1 |
| 10335 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.5 | 1 |
| 10335 | Ethylbenzene | 100-41-4 | N.D. | 0.5 | 1 |
| 10335 | n-Hexane | 110-54-3 | N.D. | 2 | 1 |
| 10335 | Isopropylbenzene | 98-82-8 | N.D. | 1 | 1 |
| 10335 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.5 | 1 |
| 10335 | Naphthalene | 91-20-3 | N.D. | 1 | 1 |
| 10335 | Toluene | 108-88-3 | N.D. | 0.5 | 1 |
| 10335 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 1 | 1 |
| 10335 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 1 | 1 |
| 10335 | Xylene (Total) | 1330-20-7 | N.D. | 0.5 | 1 |
| **GC Miscellaneous** | **SW-846 8011** | | **ug/l** | **ug/l** | |
| 10398 | Ethylene dibromide | 106-93-4 | N.D. | 0.0096 | 1 |

## General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/15.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 10335 | 8260 VOCs | SW-846 8260B | 1 | N143022AA | 10/29/2014 22:02 | Amanda K Richards | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030B | 1 | N143022AA | 10/29/2014 22:02 | Amanda K Richards | 1 |
| 10398 | EDB in Wastewater | SW-846 8011 | 1 | 143040001A | 11/03/2014 15:35 | Jessica L Miller | 1 |
| 07786 | EDB Extraction | SW-846 8011 | 1 | 143040001A | 10/31/2014 11:30 | Edwin Ortiz | 1 |

# Quality Control Summary

Client Name: Stantec Group Number: 1514157
Reported: 11/06/14 at 12:32 PM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## Laboratory Compliance Quality Control

| Analysis Name | Blank Result | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|
| Batch number: N143022AA | Sample number(s): 7653047-7653049 | | | | | | | |
| Benzene | N.D. | 0.5 | ug/l | 98 | | 78-120 | | |
| sec-Butylbenzene | N.D. | 1. | ug/l | 94 | | 75-120 | | |
| tert-Butylbenzene | N.D. | 1. | ug/l | 93 | | 80-120 | | |
| Cyclohexane | N.D. | 2. | ug/l | 80 | | 62-121 | | |
| 1,2-Dichloroethane | N.D. | 0.5 | ug/l | 96 | | 65-135 | | |
| Ethylbenzene | N.D. | 0.5 | ug/l | 92 | | 79-120 | | |
| n-Hexane | N.D. | 2. | ug/l | 74 | | 50-135 | | |
| Isopropylbenzene | N.D. | 1. | ug/l | 91 | | 80-120 | | |
| Methyl Tertiary Butyl Ether | N.D. | 0.5 | ug/l | 86 | | 75-120 | | |
| Naphthalene | N.D. | 1. | ug/l | 85 | | 47-126 | | |
| Toluene | N.D. | 0.5 | ug/l | 96 | | 80-120 | | |
| 1,2,4-Trimethylbenzene | N.D. | 1. | ug/l | 92 | | 80-120 | | |
| 1,3,5-Trimethylbenzene | N.D. | 1. | ug/l | 93 | | 80-120 | | |
| Xylene (Total) | N.D. | 0.5 | ug/l | 93 | | 80-120 | | |
| Batch number: N143032AA | Sample number(s): 7653047-7653048 | | | | | | | |
| Benzene | N.D. | 0.5 | ug/l | 103 | | 78-120 | | |
| sec-Butylbenzene | N.D. | 1. | ug/l | 100 | | 75-120 | | |
| tert-Butylbenzene | N.D. | 1. | ug/l | 99 | | 80-120 | | |
| 1,2-Dichloroethane | N.D. | 0.5 | ug/l | 99 | | 65-135 | | |
| Ethylbenzene | N.D. | 0.5 | ug/l | 101 | | 79-120 | | |
| Isopropylbenzene | N.D. | 1. | ug/l | 100 | | 80-120 | | |
| Methyl Tertiary Butyl Ether | N.D. | 0.5 | ug/l | 92 | | 75-120 | | |
| Naphthalene | N.D. | 1. | ug/l | 92 | | 47-126 | | |
| Toluene | N.D. | 0.5 | ug/l | 103 | | 80-120 | | |
| 1,2,4-Trimethylbenzene | N.D. | 1. | ug/l | 99 | | 80-120 | | |
| 1,3,5-Trimethylbenzene | N.D. | 1. | ug/l | 99 | | 80-120 | | |
| Xylene (Total) | N.D. | 0.5 | ug/l | 101 | | 80-120 | | |
| Batch number: 14302WAE026 | Sample number(s): 7653047-7653048 | | | | | | | |
| Acenaphthene | N.D. | 0.1 | ug/l | 88 | 93 | 80-112 | 6 | 30 |
| Anthracene | N.D. | 0.1 | ug/l | 86 | 96 | 82-116 | 11 | 30 |
| Benzo(a)anthracene | N.D. | 0.1 | ug/l | 72* | 90 | 81-126 | 22 | 30 |
| Benzo(a)pyrene | N.D. | 0.1 | ug/l | 73* | 95 | 82-116 | 27 | 30 |
| Benzo(b)fluoranthene | N.D. | 0.1 | ug/l | 77* | 97 | 82-121 | 24 | 30 |
| Benzo(g,h,i)perylene | N.D. | 0.1 | ug/l | 73* | 93 | 76-128 | 24 | 30 |
| Benzo(k)fluoranthene | N.D. | 0.1 | ug/l | 73* | 95 | 81-122 | 26 | 30 |
| 1,1'-Biphenyl | N.D. | 0.5 | ug/l | 88 | 92 | 56-134 | 5 | 30 |
| Di-n-butylphthalate | N.D. | 2. | ug/l | 86 | 96 | 80-119 | 11 | 30 |
| Chrysene | N.D. | 0.1 | ug/l | 72* | 92 | 81-120 | 24 | 30 |
| Dibenz(a,h)anthracene | N.D. | 0.1 | ug/l | 73* | 94 | 80-130 | 25 | 30 |
| Diethylphthalate | N.D. | 2. | ug/l | 94 | 100 | 70-118 | 6 | 30 |
| 2,4-Dimethylphenol | N.D. | 0.5 | ug/l | 87 | 87 | 75-110 | 0 | 30 |

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

# Quality Control Summary

Client Name: Stantec Group Number: 1514157
Reported: 11/06/14 at 12:32 PM

| Analysis Name | Blank Result | Blank MDL | Report Units | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dinitrophenol | N.D. | 10. | ug/l | 63 | 60 | 39-130 | 5 | 30 |
| bis(2-Ethylhexyl)phthalate | N.D. | 2. | ug/l | 86 | 95 | 78-124 | 10 | 30 |
| Fluoranthene | N.D. | 0.1 | ug/l | 78* | 91 | 82-121 | 15 | 30 |
| Fluorene | N.D. | 0.1 | ug/l | 88 | 93 | 80-117 | 5 | 30 |
| Indeno(1,2,3-cd)pyrene | N.D. | 0.1 | ug/l | 70* | 91 | 80-126 | 26 | 30 |
| 2-Methylnaphthalene | N.D. | 0.1 | ug/l | 80 | 85 | 75-106 | 6 | 30 |
| 2-Methylphenol | N.D. | 0.5 | ug/l | 86 | 81 | 72-111 | 6 | 30 |
| 4-Methylphenol | N.D. | 0.5 | ug/l | 78 | 73 | 56-109 | 6 | 30 |
| Naphthalene | N.D. | 0.1 | ug/l | 87 | 90 | 75-108 | 4 | 30 |
| 4-Nitrophenol | N.D. | 10. | ug/l | 39 | 36 | 20-89 | 7 | 30 |
| Phenanthrene | N.D. | 0.1 | ug/l | 81 | 89 | 81-114 | 10 | 30 |
| Phenol | N.D. | 0.5 | ug/l | 45 | 44 | 25-80 | 3 | 30 |
| Pyrene | N.D. | 0.1 | ug/l | 78* | 90 | 81-112 | 15 | 30 |
| Pyridine | N.D. | 2. | ug/l | 81 | 78 | 22-96 | 4 | 30 |
| Quinoline | N.D. | 1. | ug/l | 92 | 90 | 60-115 | 2 | 30 |
| Batch number: 143040001A | Sample number(s): 7653047-7653049 | | | | | | | |
| Ethylene dibromide | N.D. | 0.010 | ug/l | 103 | 102 | 60-140 | 1 | 20 |
| Batch number: 143021848003 | Sample number(s): 7653047-7653048 | | | | | | | |
| Cobalt | N.D. | 1.0 | ug/l | 104 | | 80-120 | | |
| Nickel | N.D. | 1.6 | ug/l | 105 | | 80-120 | | |
| Vanadium | N.D. | 1.9 | ug/l | 103 | | 80-120 | | |
| Zinc | 3.5 J | 2.0 | ug/l | 101 | | 80-120 | | |
| Batch number: 143026050004A | Sample number(s): 7653047-7653048 | | | | | | | |
| Lead | N.D. | 0.082 | ug/l | 101 | | 80-120 | | |

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | MS %REC | MSD %REC | MS/MSD Limits | RPD | RPD MAX | BKG Conc | DUP Conc | DUP RPD | Dup RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: N143022AA | Sample number(s): 7653047-7653049 UNSPK: P653042 | | | | | | | | |
| Benzene | 105 | 107 | 72-134 | 2 | 30 | | | | |
| sec-Butylbenzene | 102 | 105 | 74-137 | 3 | 30 | | | | |
| tert-Butylbenzene | 99 | 102 | 81-121 | 4 | 30 | | | | |
| Cyclohexane | 99 | 102 | 63-151 | 3 | 30 | | | | |
| 1,2-Dichloroethane | 98 | 100 | 63-142 | 1 | 30 | | | | |
| Ethylbenzene | 99 | 101 | 71-134 | 1 | 30 | | | | |
| n-Hexane | 99 | 102 | 73-156 | 4 | 30 | | | | |
| Isopropylbenzene | 100 | 102 | 75-128 | 2 | 30 | | | | |
| Methyl Tertiary Butyl Ether | 88 | 91 | 72-126 | 4 | 30 | | | | |
| Naphthalene | 84 | 88 | 52-125 | 5 | 30 | | | | |
| Toluene | 103 | 105 | 80-125 | 3 | 30 | | | | |
| 1,2,4-Trimethylbenzene | 99 | 101 | 72-130 | 2 | 30 | | | | |
| 1,3,5-Trimethylbenzene | 100 | 101 | 65-132 | 1 | 30 | | | | |
| Xylene (Total) | 99 | 100 | 79-125 | 2 | 30 | | | | |
| Batch number: N143032AA | Sample number(s): 7653047-7653048 UNSPK: P653587 | | | | | | | | |
| Benzene | 103 | 110 | 72-134 | 6 | 30 | | | | |

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

# Quality Control Summary

Client Name: Stantec Group Number: 1514157
Reported: 11/06/14 at 12:32 PM

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | MS %REC | MSD %REC | MS/MSD Limits | RPD | RPD MAX | BKG Conc | DUP Conc | DUP RPD | Dup RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| sec-Butylbenzene | 107 | 110 | 74-137 | 3 | 30 | | | | |
| tert-Butylbenzene | 106 | 112 | 81-121 | 6 | 30 | | | | |
| 1,2-Dichloroethane | 100 | 99 | 63-142 | 1 | 30 | | | | |
| Ethylbenzene | 103 | 107 | 71-134 | 4 | 30 | | | | |
| Isopropylbenzene | -2345 (2) | 7 (2) | 75-128 | 183* | 30 | | | | |
| Methyl Tertiary Butyl Ether | 96 | 98 | 72-126 | 2 | 30 | | | | |
| Naphthalene | 88 | 93 | 52-125 | 6 | 30 | | | | |
| Toluene | 100 | 109 | 80-125 | 9 | 30 | | | | |
| 1,2,4-Trimethylbenzene | 102 | 107 | 72-130 | 5 | 30 | | | | |
| 1,3,5-Trimethylbenzene | 103 | 107 | 65-132 | 3 | 30 | | | | |
| Xylene (Total) | 102 | 106 | 79-125 | 3 | 30 | | | | |
| Batch number: 143040001A | Sample number(s): 7653047-7653049 UNSPK: P650710 BKG: P650711 | | | | | | | | |
| Ethylene dibromide | 100 | | 60-140 | | | N.D. | N.D. | 0 (1) | 30 |
| Batch number: 143021848003 | Sample number(s): 7653047-7653048 UNSPK: 7653047 BKG: 7653047 | | | | | | | | |
| Cobalt | 100 | 102 | 75-125 | 1 | 20 | N.D. | N.D. | 0 (1) | 20 |
| Nickel | 101 | 103 | 75-125 | 2 | 20 | N.D. | N.D. | 0 (1) | 20 |
| Vanadium | 102 | 103 | 75-125 | 1 | 20 | N.D. | N.D. | 0 (1) | 20 |
| Zinc | 99 | 101 | 75-125 | 2 | 20 | 5.1 J | 5.0 J | 2 (1) | 20 |
| Batch number: 143026050004A | Sample number(s): 7653047-7653048 UNSPK: P653295 BKG: P653295 | | | | | | | | |
| Lead | 103 | 103 | 75-125 | 0 | 20 | N.D. | N.D. | 0 (1) | 20 |

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed
unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 8260 VOCs
Batch number: N143022AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 7653049 | 101 | 102 | 97 | 92 |
| Blank | 102 | 104 | 97 | 90 |
| LCS | 100 | 104 | 101 | 99 |
| MS | 99 | 103 | 100 | 99 |
| MSD | 99 | 101 | 100 | 97 |
| Limits: | 80-116 | 77-113 | 80-113 | 78-113 |

Analysis Name: 8260 VOCs
Batch number: N143032AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 7653047 | 97 | 100 | 103 | 100 |
| 7653048 | 98 | 101 | 100 | 99 |
| Blank | 102 | 105 | 96 | 91 |
| LCS | 99 | 101 | 101 | 98 |
| MS | 99 | 102 | 98 | 98 |

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

# Quality Control Summary

Client Name: Stantec Group Number: 1514157
Reported: 11/06/14 at 12:32 PM

## Surrogate Quality Control

| | | | | |
|---|---|---|---|---|
| MSD | 98 | 99 | 99 | 99 |
| Limits: | 80-116 | 77-113 | 80-113 | 78-113 |

Analysis Name: Skinner List in Water by 8270C
Batch number: 14302WAE026

| | Phenol-d6 | 2-Fluorophenol | 2,4,6-Tribromophenol | Nitrobenzene-d5 | 2-Fluorobiphenyl | Terphenyl-d14 |
|---|---|---|---|---|---|---|
| 7653047 | 52 | 53 | 89 | 6* | 83 | 81 |
| 7653048 | 53 | 51 | 89 | 3* | 79 | 73 |
| Blank | 33 | 48 | 85 | 90 | 84 | 92 |
| LCS | 38 | 54 | 86 | 94 | 82 | 64 |
| LCSD | 37 | 49 | 89 | 94 | 86 | 87 |
| Limits: | 10-83 | 10-107 | 22-150 | 60-123 | 67-116 | 40-147 |

Analysis Name: EDB in Wastewater
Batch number: 143040001A

| | 1,1,2,2-Tetrachloroethane |
|---|---|
| 7653047 | 105 |
| 7653048 | 111 |
| 7653049 | 108 |
| Blank | 104 |
| DUP | 103 |
| LCS | 104 |
| LCSD | 102 |
| MS | 100 |
| Limits: | 46-136 |

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

# Environmental Analysis Request/Chain of Custody

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Acct. # 11183 For Eurofins Lancaster Laboratories Environmental use only Group # 1514157 Sample # 7653047-49
Instructions on reverse side correspond with circled numbers.

366419

## 1 Client Information

| | |
|---|---|
| Client: Stantec Consulting Services | Acct. #: |
| Project Name/#: MHIC Annual Sampling | PWSID #: |
| Project Manager: Stephanie Andrews | P.O. #: |
| Sampler: C. Dubinski | Quote #: |

Name of state where samples were collected: PA

## 4 Matrix

Soil ☐ Sediment ☐ Water ☒ Ground ☐ Potable ☐ NPDES ☐ Surface ☐ Other: ____

## 5 Analysis Requested

Preservation Codes

## For Lab Use Only

FSC: ____
SCR#: 1103153

**Preservation Codes**
H=HCl T=Thiosulfate
N=$HNO_3$ B=NaOH
S=$H_2SO_4$ O=Other

## 6 Remarks

See attached analysis sheet: Cobalt, Lead, Nickel, Vanadium, Zinc

| 2 Sample Identification | Collected Date | Collected Time | 3 Grab | Composite | Total # of Containers | VOCs by EPA Method 5760 | EDB by EPA Method 8011 | Metals by Method 6010/6020 | SVOCs by EPA Method 8270 |
|---|---|---|---|---|---|---|---|---|---|
| MW-455_20141024 | 10-24-14 | 1250 | X | | 5 | X | X | X | X |
| MW-456_20141024 | 10-24-14 | 1315 | X | | 5 | X | X | X | X |
| Trip Blank | | | | | 2 | X | | | |
| Trip Blank | | | | | 2 | | X | | |

## 7 Turnaround Time (TAT) Requested (please circle)

~~Standard~~ Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: Stephanie.andrews@stantec.com

## 8 Data Package Options (circle if required)

Type I (Validation/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

| Relinquished by | Date | Time | Received by | Date | Time |
|---|---|---|---|---|---|
| [illegible] | 10/24/14 | 0930 | [illegible] | 10/24/14 | 0930 |
| [illegible] | [illegible] | 1223 | [illegible] | 10/24 | 1233 |
| [illegible] | 10-27-14 | 1403 | [illegible] | 10/27/14 | 1403 |
| [illegible] | [illegible] | [illegible] | | | |
| | | | [illegible] | 10/27/14 | 1720 |

9

EDD Required? ~~Yes~~ No
If yes, format: Equis

Site-Specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:
UPS ____ FedEx ____ Other ____

Temperature upon receipt 1.0 °C

11183/1514157/7653047-49

# Comprehensive COC List for Sunoco Characterizations (Sept. 2013)

| VOCs by EPA Method 8260 | CAS No. |
|---|---|
| Benzene | 71-43-2 |
| Butylbenzene, sec- | 135-98-8 |
| Butylbenzene, tert- | 98-06-6 |
| Cumene | 98-82 8 |
| Cyclohexane | 110-82-7 |
| Dichloroethane, 1,2- | 107 06 2 |
| Ethylbenzene | 100-41-4 |
| Hexane | 110-54 3 |
| Methyl tert butyl ether | 1634-04-4 |
| Toluene | 108 88 3 |
| Trimethylbenzene, 1,2,4- | 95-63-6 |
| Trimethylbenzene, 1,3,5- | 108 67 8 |
| Xylenes | 1330-20-7 |
| Naphthalene | 91-20-3 |

| EDB by EPA Method 8011 | CAS No. |
|---|---|
| Ethylene Dibromide | 106-93-4 |

| Metals by Method 6010/6020 | CAS No. |
|---|---|
| Cobalt | 7440-48-4 |
| Lead | 7439-92-1 |
| Nickel | 7440-02-0 |
| Vanadium | 7440 62-2 |
| Zinc | 7440-66-6 |

| SVOCs by EPA Method 8270 | CAS No. |
|---|---|
| Acenaphthene | 83-32-9 |
| Anthracene | 120-12-7 |
| Benzo(a)anthracene | 56-55-3 |
| Benzo(a)pyrene | 50 32-8 |
| Benzo(b)fluroranthene | 205-99-2 |
| Benzo(g,h,i)perylene | 191 24-2 |
| Benzo(k)fluoranthene | 207-08-9 |
| Biphenyl, 1,1- | 92-52 4 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 |
| Chrysene | 218-01 9 |
| Cresol, m- (3-methylphenol) | 108-39-4 |
| Cresol, o- (2-methylphenol) | 95-48-7 |
| Cresol, p- (4-methylphenol) | 106-44-5 |
| Dibenz(a,h)anthracene | 53-70-3 |
| Diethyl phthalate | 84-66-2 |
| Dimethylphenol, 2,4- | 105-67-9 |
| Dibutyl phthalate, n- | 84-74-2 |
| Dinitrophenol, 2,4- | 51-28-5 |
| Fluoranthene | 206-44-0 |
| Fluorene | 86-73-7 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 |
| Methylnaphthalene, 2- | 91-57-6 |
| Naphthalene | 91-20-3 |
| Nitrophenol, 4 | 100 02-7 |
| Phenanthrene | 85-01-8 |
| Phenol | 108 95 2 |
| Pyrene | 129-00-0 |
| Pyridine | 110 86 1 |
| Quinoline | 91-22-5 |

List from PADEP SERO Crude Oil Parameters for Corrective Action (CDB | SERO | PA DEP | 9 Aug 201
combined with PADEP Petroleum Shortlist (leaded and unleaded gasoline and No. 2, 4, 5, 6 Fuel Oils

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# Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

| | | | |
|---|---|---|---|
| **RL** | Reporting Limit | **BMQL** | Below Minimum Quantitation Level |
| **N.D.** | none detected | **MPN** | Most Probable Number |
| **TNTC** | Too Numerous To Count | **CP Units** | cobalt-chloroplatinate units |
| **IU** | International Units | **NTU** | nephelometric turbidity units |
| **umhos/cm** | micromhos/cm | **ng** | nanogram(s) |
| **C** | degrees Celsius | **F** | degrees Fahrenheit |
| **meq** | milliequivalents | **lb.** | pound(s) |
| **g** | gram(s) | **kg** | kilogram(s) |
| **µg** | microgram(s) | **mg** | milligram(s) |
| **mL** | milliliter(s) | **L** | liter(s) |
| **m3** | cubic meter(s) | **µL** | microliter(s) |
| | | **pg/L** | picogram/liter |

**<** less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

**>** greater than

**ppm** parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

**ppb** parts per billion

**Dry weight basis** Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

*Data Qualifiers:*

**C –** result confirmed by reanalysis.

**J -** estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

*U.S. EPA CLP Data Qualifiers:*

| Organic Qualifiers | | Inorganic Qualifiers | |
|---|---|---|---|
| **A** | TIC is a possible aldol-condensation product | **B** | Value is <CRDL, but ≥IDL |
| **B** | Analyte was also detected in the blank | **E** | Estimated due to interference |
| **C** | Pesticide result confirmed by GC/MS | **M** | Duplicate injection precision not met |
| **D** | Compound quantitated on a diluted sample | **N** | Spike sample not within control limits |
| **E** | Concentration exceeds the calibration range of the instrument | **S** | Method of standard additions (MSA) used for calculation |
| **N** | Presumptive evidence of a compound (TICs only) | **U** | Compound was not detected |
| **P** | Concentration difference between primary and confirmation columns >25% | **W** | Post digestion spike out of control limits |
| **U** | Compound was not detected | ***** | Duplicate analysis not within control limits |
| **X,Y,Z** | Defined in case narrative | **+** | Correlation coefficient for MSA <0.995 |

**Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.